

WHAT IS CLAIMED IS:

1. A method of manufacturing an image displaying apparatus, comprising the steps of:

5 a: disposing a substrate, on which an electrical conductor and a wiring connected to the conductor, on a support; covering the conductor with a container except for a part of the wiring; setting the container into a desired atmosphere therein; and applying a voltage to the conductor through the part of wiring, whereby
10 forming an electron-emitting device at a part of the conductor to thereby forming an electron source substrate;

b: preparing a phosphor substrate on which phosphor emitting light by the electron-emitting device
15 is arranged, and disposing the electron source substrate and the phosphor substrate within vacuum atmosphere;

c: carrying under a vacuum atmosphere one or both of the electron source substrate and the phosphor
20 substrate into the vacuum atmosphere in a gettering process chamber, and subjecting to a gettering process only one substrate carried therein, or the one or both of the substrates carried therein; and

d: carrying under the vacuum atmosphere the
25 electron source substrate and the phosphor substrate in a seal-bonding process chamber, and subjecting to heat seal-bonding the substrates in an opposing state.

2. A method of manufacturing an image displaying apparatus according to claim 1, wherein the step of setting the container into a desired atmosphere therein comprises a step of exhausting the inside of the container.

3. A method of manufacturing an image displaying apparatus according to claim 1, wherein the step of setting the container into a desired atmosphere therein comprises a step of introducing a gas into the container.

4. A method of manufacturing an image displaying apparatus according to claim 1, further comprising a process of fixing, onto the support, the substrate used for the electron source substrate.

5. A method of manufacturing an image displaying apparatus according to claim 1, wherein the process of fixing, onto the support, the substrate used for the electron source substrate comprises a step of vacuum-adsorbing the substrate onto the support.

6. A method of manufacturing an image displaying apparatus according to claim 1, wherein the process of fixing, onto the support, the substrate used for the electron source substrate comprises a step of

electrostatically-adsorbing the substrate onto the support.

7. A method of manufacturing an image displaying
5 apparatus according to claim 1, wherein the step of
disposing, on the supporting member, the substrate used
for the electron source substrate is performed while
sandwiching a heat conductor between the substrate and
the supporting member.

10

8. A method of manufacturing an image displaying
apparatus according to claim 1, wherein the step of
applying a voltage to the conductor comprises a step of
adjusting the temperature of the substrate.

15

9. A method of manufacturing an image displaying
apparatus according to claim 1, wherein the step of
applying a voltage to the conductor comprises a step of
heating the substrate used for the electron source
20 substrate.

20

10. A method of manufacturing an image displaying
apparatus according to claim 1, wherein the step of
applying a voltage to the conductor comprises a step of
25 cooling the substrate used for the electron source
substrate.

11. A method of manufacturing an image displaying apparatus according to claim 1, wherein the processes b, c, and d are processes set within an in-line.

5 12. A method of manufacturing an image displaying apparatus according to claim 1, wherein the processes b, c, and d are processes set within an in-line, and a heat shielding material is disposed between the
10 gettering process chamber and the seal-bonding process chamber.

13. A method of manufacturing an image displaying apparatus according to claim 1, wherein the heat
15 shielding material is formed of a reflective metal.

14. A method of manufacturing an image displaying apparatus according to claim 1, wherein the processes b, c, and d are processes set within an in-line, and a gate valve is disposed between the gettering process
20 chamber and the seal-bonding process chamber.

15. A method of manufacturing an image displaying apparatus according to claim 1, wherein the processes b, c, and d are processes set on a star arrangement.

25

16. A method of manufacturing an image displaying apparatus according to claim 1, wherein the processes

b, c, and d are processes set on a star arrangement, and the gettering process chamber and the seal-bonding process chamber are partitioned by an independent chamber.

5

17. A method of manufacturing an image displaying apparatus according to claim 1, wherein the phosphor exciting means comprises means for emitting electron beam.

10

18. A method of manufacturing an image displaying apparatus according to claim 1, wherein the electron source substrate comprises an outer frame fixedly disposed preliminary to its periphery.

15

19. A method of manufacturing an image displaying apparatus according to claim 1, wherein the electron source substrate comprises a spacer fixedly disposed preliminary to an inside thereof.

20

20. A method of manufacturing an image displaying apparatus according to claim 1, wherein the electron source substrate comprises the outer frame fixedly disposed preliminary to its periphery, and the spacer fixedly disposed preliminary to the inside thereof.

25

21. A method of manufacturing an image displaying

apparatus according to claim 1, wherein the phosphor substrate comprises an outer frame fixedly disposed preliminary to its periphery.

5 22. A method of manufacturing an image displaying apparatus according to claim 1, wherein the phosphor substrate comprises a spacer fixedly disposed preliminary to an inside thereof.

10 23. A method of manufacturing an image displaying apparatus according to claim 1, wherein the phosphor substrate comprises the outer frame fixedly disposed preliminary to its periphery, and the spacer fixedly disposed preliminary to the inside thereof.

15 24. A method of manufacturing an image displaying apparatus according to claim 1, wherein the getter used in the above process C is an evaporable getter such as a barium getter.

20 25. A method of manufacturing an image displaying apparatus according to claim 1, wherein the evaporable getter is a barium getter.

25 26. A method of manufacturing an image displaying apparatus according to claim 1, wherein the seal-bonding material used in the above process d is a low

melting point material.

27. A method of manufacturing an image displaying
apparatus according to claim 26, wherein the low
5 melting point material is a low melting point metal or
an alloy thereof.

28. A method of manufacturing an image displaying
apparatus according to claim 27, wherein the low
10 melting point metal is indium or an alloy thereof.

29. A method of manufacturing an image displaying
apparatus according to claim 26, wherein the low
melting point material is frit glass.
15

30. A method of manufacturing an image displaying
apparatus according to claim 1, further comprising a
step of arranging the electron-emitting devices in
matrix, and forming wirings so as to connect in matrix
20 the electron-emitting devices arranged in matrix.

31. An apparatus for manufacturing an image
displaying apparatus, comprising:

a: an electron source substrate manufacturing
25 apparatus including: a supporting member for supporting
a substrate on which an electrical conductor is formed;
a gas introducing port; and a gas exhausting port; a

container covering a region of a part of the substrate surface; means for introducing a gas into the container connected to the gas introducing port; and means for exhausting the inside of the container connected to the gas exhausting port, in which a voltage is applied to the conductor, and an electron-emitting device is formed at a part of the conductor, whereby manufacturing the electron source;

b: means for conveying the electron source substrate obtained through the electron source substrate and a phosphor substrate provided with phosphors thereon;

c: a first vacuum chamber into which one or both of the electron source substrate and the phosphor substrate can be carried under the vacuum atmosphere by the conveying means;

d: means for giving getter having a getter precursor disposed in the first vacuum chamber and a getter activating means for activating the getter precursor;

e: a second vacuum chamber in which the electron source substrate and the phosphor substrate can be carried under the vacuum atmosphere by the conveying means;

f: substrate arranging means, disposed in the second vacuum chamber, for arranging the electron source substrate and the phosphor substrate in

positions opposing with each other by orienting the electron-emitting device and the phosphor toward inside; and

5 g: seal-bonding means, arranged in the second vacuum chamber, for heat seal-bonding at predetermined temperature the electron source substrate and the phosphor substrate arranged in opposing positions by the substrate arranging means.

10 32. An apparatus for manufacturing an image displaying apparatus according to claim 31, wherein the first vacuum chamber and the second vacuum chamber are preferably disposed within an in-line.

15 33. An apparatus for manufacturing an image displaying apparatus according to claim 31, wherein the first vacuum chamber and the second vacuum chamber are disposed within an in-line, and the respective chambers are partitioned by a heat shielding material.

20 34. An apparatus for manufacturing an image displaying apparatus according to claim 31, wherein the first vacuum chamber and the second vacuum chamber are disposed on one line, and the respective chambers are
25 partitioned by a gate valve.

35. An apparatus for manufacturing an image

displaying apparatus according to claim 31, wherein the first vacuum chamber and the second vacuum chamber are provided on a star arrangement, and the respective chambers are partitioned by an independent chamber.

5

36. An apparatus for manufacturing an image displaying apparatus according to claim 31, wherein the supporting member comprises a fixing means for fixing the substrate onto the supporting member.

10

37. An apparatus for manufacturing an image displaying apparatus according to claim 31, wherein the supporting member comprises means for vacuum adsorbing the substrate and the supporting member.

15

38. An apparatus for manufacturing an image displaying apparatus according to claim 31, wherein the supporting member comprises means for electrostatically-adsorbing the substrate onto the supporting member.

20

39. An apparatus for manufacturing an image displaying apparatus according to claim 31, wherein the supporting member comprises a heat conductor.

25

40. An apparatus for manufacturing an image displaying apparatus according to claim 31, wherein the

supporting member comprises a temperature adjusting means for the substrate.

41. An apparatus for manufacturing an image
5 displaying apparatus according to claim 31, wherein the supporting member comprises heating means.

42. An apparatus for manufacturing an image
10 displaying apparatus according to claim 31, wherein the supporting member comprises cooling means.

43. An apparatus for manufacturing an image
15 displaying apparatus according to claim 31, wherein the container comprises, in the container, means for diffusing a gas introduced thereinto.

44. An apparatus for manufacturing an image
20 displaying apparatus according to claim 31, further comprising means for heating a gas to be introduced.

45. An apparatus for manufacturing an image
25 displaying apparatus according to claim 31, wherein further comprising means for removing the moisture from the gas to be introduced.

46. An apparatus for manufacturing an image
displaying apparatus according to claim 31, wherein the

electron-emitting devices are arranged in a matrix, and the wirings are arranged so as to connect in matrix the electron-emitting devices arranged in matrix.

5

10

15

20

25